man, but was content to work on, happy if his discoveries contributed to the advancement of science. It is to the labours of such men that the progress of the world, both scientific and industrial, is due; for the methods which he introduced have led, not merely to a knowledge of the structure of many compounds which would otherwise have remained unknown, but have also had a profound influence on chemical theory, and have led to many discoveries of the utmost practical utility. He lived a happy and contented life, and even in his death his desire was satisfied; for in his discourse at the grave of his predecessor in the office of dean of the Faculty of Science at Grenoble, Lory, he gave utterance to the words:—"Puisque la mort est inévitable, ne vaut il pas mieux tomber ainsi tout entier, que de sentir la diminution lente et progressive de ses forces et de son intelligence?" Raoult died, after a few days' illness, without pain.

W. R.

DR. A. HIRSCH.

INFORMATION has reached us from the president of the Council of State for the Republic and Canton of Neuchâtel of the death, at Neuchâtel on April 18, of Dr. Adolph Hirsch, aged 71, the director of the observatory at Neuchâtel since its foundation in 1859. Dr. Hirsch was also secretary to the International Committee of Weights and Measures, established at Paris under the Metric Convention of 1875.

Dr. Hirsch contributed largely to our knowledge astronomy and meteorology, his earlier papers on the former subject having appeared in Berlin and Vienna, and his later papers, particularly with reference to the establishment and position of the new observatory in the Neuchâtel *Bulletin*. ("Établissement de l'Observatoire à Neuchâtel," *Bul.* v. 1859-1861; "Recherchés sur des Pendules Astronomiques," *Bul.* v. 1859-1861; "Découverte de deux nouvelles petites planètes," *Bul.* v. 1859-1861; "Rélation des phénomènes météorologique avec la marche, des instruments magnétiques," *Bul.* vi.; "Influence des taches du Soleil sur la temperature de la Terre," 1877; Sur le passage de Venus," 1883, etc.). In more recent years Dr. Hirsch has been closely identified with the introduction of the metric system of weights and measures as an international system. He was a member of the original Commission International du Metre of 1872, of which the present eminent director of the Imperial Observatory, Dr. W. Foerster, and Dr. Von Lang, of the University of Vienna, were also members. On the establishment of the new International Committee of Weights and Measures in 1875, Dr. Hirsch became its secretary, a position which he filled until his death. A master in metrological science and a prince of secretaries, his loss will be deeply deplored by all whose opportunity it was to seek his valuable advice and to be guided by his profound experience.

NOTES.

THE gentlemen's soiree of the Royal Society will be held next Wednesday, May 8. The ladies' conversazione will not be held this year, in consequence of the death of Queen Victoria.

THE position of affairs at Coopers Hill College is most unsatisfactory. We understand that the Members of Parliament who are interested in the higher education of the country had obtained permission to move the adjournment of the House in order to discuss the latest report on the management of this institution laid before Parliament by Lord George Hamilton, but that some M.P., presumably at the instigation of the India Office, which shuns inquiry, has "blocked" this permission. This proceeding, which, unfortunately, the rules of the House allows, is but another instance of the diminishing power of the private member and the increasing domination of the Government. Lord George Hamilton stated last week that he had asked the Universities of Oxford, Cambridge and London to nominate representatives on the Board of Visitors. When reconstituted the Board is to appoint a committee to hold an inquiry into the whole working of the College. This committee can do nothing to lessen the gravity of the recent action of the Board of Visitors in the matter of the dismissed teachers. They may, however, be able to secure some sort of recognition of the professoriate in the management and policy of the College, and some diminution of the absolute power of one individual, which has recently wrought such harm both at Coopers Hill in England and at the Leland Stanford University in America.

THE reality of the connection between rats and plague is prominently brought into notice by the issue of a circular by the Local Government Board, instructing the sanitary authorities of seaports to take precautions against the entrance of plague-infected rats into this country. On the arrival in port of a vessel upon which, during the voyage, plague or sickness suspected to be plague has occurred, measures are to be taken to secure the destruction of the rats on board the vessel, and to prevent them from reaching the shore. In the case of vessels that have come from places infected with plague, strict inquiry is to be made on their arrival in port as to mortality or sickness among rats during the voyage. In the event of rats on board any ship being found to be infected with plague, all parts of the vessel frequented by those animals are, so far as possible, to be disinfected. The authorities of seaport towns invaded by plague are advised to endeavour to secure the destruction of the rats in the town, not least those inhabiting the docks and quayside warehouses. In connection with these instructions, it is worth while to bear in mind that plague is not usually transmitted by the bite of a diseased rat, but by fleas living on such rats. Experiments have shown that a healthy rat will quickly contract plague if caged with a diseased rat infested with fleas, but will not do so if the diseased rat is free from fleas. Perfectly healthy rats harbour very few fleas and are very expert in removing them, but these insects are abundant on sick rats. After death, as the body becomes cold, the fleas leave the rat, and if they reach another rat or human being they may inoculate their new host with the bacilli of plague.

PROF. BROUARDEL, Dean of the Paris Faculty of Medicine, has announced that at the end of his present term of office—namely, in February 1902—he will not accept re-appointment.

THE Rev. James Chalmers, who is reported to have been murdered in New Guinea, with the Rev. O. F. Tomkins and twelve students, was known to many anthropologists, and made some noteworthy contributions to our knowledge of the natives of New Guinea, where he passed twenty-three years of his life. His death has often been reported before now, and there is always a possibility that rumours from New Guinea will prove to be untrue; but we fear that in this case the news will be confirmed.

THE founders' medal of the Royal Geographical Society has been awarded to the Duke of the Abruzzi for his expedition to Mount St. Elias and for Arctic exploration. Dr. A. Donaldson Smith has been awarded the patrons' medal for his African expeditions and the important scientific observations made in connection with them. Awards have also been made to Mr. Louis Bernacchi and Captain Colbech for their aid in the *Southern Cross* Antarctic expedition, and to Captain Cagni for his journey to 86° 33′ N., on the Duke of the Abruzzi's expedition.

We are reminded by the *British Medical Journal* that on October 13 Prof. Rudolf Virchow will complete his 80th year, and preparations are already being made by his numerous friends and pupils to celebrate that interesting anniversary with appropriate pomp and circumstance. A committee has been formed for the purpose of collecting subscriptions, to be applied to the development of the Rudolf Virchow Stiftung, which was established for the furtherance of science in 1881. The president of the committee is Prof. Waldeyer, the distinguished anatomist of Berlin; the secretary is Prof. Posner.

The committee appointed by the International Congress of Geologists in August last has, says *Science*, announced as the subject proposed for the Spendiaroff prize for 1903 "A Critical Review of the Methods of Classification of Rocks" (Revue critique des méthodes de classification des roches). The value of the prize is 456 roubles, or about 64*l.* Manuscripts should be addressed to M. Charles Barrois, secrétaire général du Congrès Géologique International, 62, Boulevard Saint Michel, Paris. At least two copies of papers submitted in competition are required, and they should be sent, at the latest, a year before the next session of the Congress in 1903.

The erection of a memorial to the late Prof. Huxley in Ealing, where he was born and received his early education, is contemplated. On the initiative of the council of the Ealing Natural Science Society, a committee of those persons connected with the district who are interested in the project has been formed. The first meeting of this committee was held on March 29, when an executive committee was appointed with the Rev. Prof. G. Henslow as chairman. A bronze medallion portrait has been advocated for the central feature of the design, which may take the form of a simple mural tablet or of a more worthy monument, as funds are obtainable, while should that support be forthcoming for which its projectors hope, an annual grant or medal might also be founded. Subscription to the fund is not confined to residents in Ealing, and persons who may be desirous of assisting in the endeavour to show honour to the memory of Huxley in the place of his birth should communicate with the treasurer of the fund (Mr. T. Simpson, Fennymere, Castle Bar, Ealing), or with the secretary (Mr. B. B. Woodward, 120 The Grove, Ealing).

The investigation of the Louisiana Gulf Coast, made by Prof. Beyer for the American Ornithological Association for the purpose of stationing wardens to protect the sea birds, shows that action was not taken a moment too soon. Prof. Beyer found that nearly all the breeding places of the birds had been destroyed by killing the birds themselves and taking their eggs. Not a trace of birds was found on either Brush or Caillou Islands, at one time the home of millions of sea fowl. The same was true of Calumet and Castelle Islands, on which every living thing had been killed. A few gulls and hens were found left on Timbalier Island, and there are said to be a few on Last Island, which, however, could not be visited on account of the severe weather. Wardens were appointed wherever birds were found, and the fishermen of the neighbourhood promised to co-operate with the wardens in preventing the killing of the birds in the breeding season and the stealing of eggs.

The annual general meeting of the Zoological Society was held on Monday. In the report of the council, reference was made to the publication of the fifteenth volume of the Society's *Transactions*, consisting of a monograph of the genus Casuarius, by the Hon. Walter Rothschild. A new pheasantry was built during the past year, and is now tenanted by a full series of members of the pheasant family. The number of visitors to the Gardens in 1900 was 697,178, showing a slight increase over the corresponding number in the previous year. The number of animals living in the Society's Gardens at the end of December last was 2865, of which 758 were mammals, 1495 birds, and 612 reptiles and batrachians. Amongst the additions made during the past year thirty-one were specially commented upon as being of remarkable interest, and in most cases new to the Society's collection. The Duke of Bedford was re-elected president of the Society.

We learn from the *Electrician* that, in response to the complaints of a number of leading shipping companies, including the White Star, Cunard and American Lines, the Board of Trade has instructed the Marconi Company to erect a signalling station on the mainland close to the Fastnet Rock, at the western extremity of Ireland. All vessels fitted with wireless transmitting apparatus will henceforth be able to report to the shore when many miles outside the Fastnet, and this will, of course, abolish the waste of time and labour caused by the necessity for incoming steamers to pass inside the Fastnet in order to report to Lloyd's station on the mainland.

The deposits of salt at Salton, California, U.S.A., forms one of the sights of America. They occur in a depressed portion of the Colorado Desert, parts of which are as much as three hundred feet below sea-level. The deposits cover as much as a thousand acres, and the company in possession of the area has shipped from it annually about two thousand tons of salt. The salt is cut by means of a plough and is piled into heaps such as those shown in the accompanying illustration, reproduced from the *Scientific American*. Each plough harvests about seven hundred tons of salt per day. A singular characteristic of the bed is that the salt is being deposited daily by springs which run into the basin, and as the water evaporates it leaves behind a crust of almost pure sodium chloride, which ranges from ten to twenty inches in thickness over the area. Geographers will remember that the deposits occupy part of the area of the desert of California flooded to the extent of hundreds of square miles in 1892, when the Colorado River broke it barriers.

The origin of coal and the extent to which the coalfields of Great Britain have been worked were the scientific questions dealt with by Mr. E. B. Wethered in his presidential address to the Cotteswold Naturalists' Field Club on April 23. It was pointed out that the extent of our present exportation of coal was not contemplated by the Royal Coal Commission in 1871. In 1867 the amount of coal exported was 10,233,135 tons, and it was thought that no considerable increase would take place, whereas nearly fifty-six million tons were exported in the year 1899, including about twelve million tons consumed by steamers engaged in foreign trade. In the matter of home consumption the Commissioners were remarkably correct, their estimate for 1899 being 162,400,000 tons, the actual figures being 164,284,757 tons. Mr. Wethered suggests that another Commission should be appointed to consider the probable duration of the coalfields. Another point on which information is required is as to what natural stores of coal are under the Secondary rocks, and at what depths. It is of national importance that this information should be obtained.

Symons's Meteorological Magazine for April contains what purports to be the first tables of the climate of Pemba ever published. They were taken by Mr. T. Burtt at Banani, during the years 1899 and 1900. The small island of Pemba forms, with Zanzibar, that portion of the British East Africa Protectorate nominally under the rule of the Sultan of Zanzibar, the position of Banani being approximately 5° 15′ S., 39° 43′ E. The temperature is of course very uniform, the mean of the monthly maxima being 83°·4 and of the minima 70°·8, the absolute maximum being 95° and the minimum 65°. The rainfall is copious, averaging about 98 inches. The two rainy seasons are well marked, the greater being March to May, and the less November to January.

MR. G. W. KIRKALDY has favoured us with a copy of his paper on the stridulating organs of water-bugs, recently published in the *Journal* of the Quekett Microscopical Club. The males of these insects, which alone produce the sounds, can mostly be referred to their proper species from the stridulating organs alone. Generally it seems that the sound is produced by drawing the comb-like structure situated on the tarsus of one leg across the femur of the other, and *vice versâ*. But it is believed that there is also a second musical area, one of the constituents, at least, of which is situated on the abdomen. Observations are needed as to the precise *modus operandi* of both types of stridulating organs in these insects.

THE *Biologisches Centralblatt* of April 1 contains the two concluding sections of Dr. C. Rengel's account of the life-history of the great black water-beetle commonly known as *Hydrophilus piceus*. It is shown that, unlike those of the brown water-beetles (*Dytiscus*), which devour free-swimming creatures like tadpoles and the larvæ of other insects, the larvæ of the black water-beetle subsists on slow-moving organisms, especially pond-snails. In the earlier stages of their existence the larvæ devote their attention to Physa and the smaller kinds of Lymnæa, but when full grown they do not hesitate to attack the comparatively large *Planorbis corneus*. The idea that these larvæ always seek a hole in the ground in which to pupate is shown to be incorrect, the transformation having been observed to take place among a mass of weeds. It seems also that when a hole is selected, this is not excavated by the larvæ themselves. By an inadvertence the title of this paper occurs in the table of contents of the *Centralblatt* of April 15.

THE issue of the *Revue Scientifique* of April 20 contains the first instalment of an interesting article by M. Henri Coupin on the song of birds. The author commences by referring to the large proportion of tuneful species met with among the birds of Europe, which he sets at ten per cent., whereas in the tropics it falls as low as one per thousand. The gorgeous birds of the tropics he compares to actresses without talent, who depend for success on the richness of their toilets. Stress is then laid on the fact that, in spite of its simplicity, bird-song cannot be imitated by any known musical instruments. It is possible, indeed, to reproduce the pitch and intensity of the notes, but not the *timbre*, which includes such a multitude of sounds as to defy imitation. Indeed, the observations of M. F. Lescuyer have shown that although the notes of birds correspond to those of our musical scale, yet they also include a number of vibrations occupying the intervals between our notes, and it is this which renders imitation impossible. In most birds the duration of the song is very brief; in the thrush and the chaffinch it lasts only two or three seconds, in the blackcap from four to five seconds, and from two to five minutes in the lark. The author then proceeds to analyse the sounds constituting the songs of birds, and to distinguish between their songs and their alarm-cries.

WE have just received Part vii. of the bibliography of the more important contributions to American economic entomology, issued by the U.S. Department of Agriculture (Division of Entomology), extending from December 31, 1896, to January 1, 1900. This part, prepared under the direction of Prof. L. O. Howard, the entomologist, by his assistant, Mr. Nathan Banks, contains an alphabetical index, under authors' names, of 1383 papers in different American periodicals, and a subject-index extending to thirteen pages (double columns) in small type. The book is a good illustration of the energy with which economic entomology is pursued in the United States, where, however, it must be remembered that insects are much more numerous and destructive than in Europe, or at least in England.

THE issue of *Die Umschau* for April 20 contains a short illustrated article on the ship *Gauss*, which has been built for the German Antarctic Expedition. A photograph from a model and some views of the vessel in various stages of construction are reproduced.

DR. E. FRIEDRICH contributes a paper on the india-rubber production of Africa to the *Deutsche geographische Blätter*. The export statistics of twenty-five African colonies are dealt with, and the results exhibited graphically on a sketch-map, from which some interesting geographical conclusions are drawn.

THE *Verhandlungen* of the Berlin *Gesellschaft für Erdkunde* contain a brief abstract of a lecture, by Dr. K. Kretschmer, on the physical development of the North Sea coasts during historic times. The author refers specially to the regions near the mouths of the rivers Ems and Jade, and describes changes recorded by various authorities since Roman times.

WITH reference to Mr. T. W. Kingsmill's letter in last week's issue (p. 608), Prof. Haddon writes to say that he appreciates its value, but at the same time he wishes to disclaim any first-hand knowledge of Chinese authorities, and to remark that in his article he merely gave an account of M. Ujfalvy's views.

A VOLUME on the history of physiology during the sixteenth, seventeenth and eighteenth centuries, by Sir Michael Foster, will shortly be published in the Cambridge University Press Biological Series, edited by Mr. A. E. Shipley. The book will consist of lectures delivered by the author last autumn before the Cooper Medical College in San Francisco. Without claiming to be a complete history of the subject the book will contain a full account of the chief advances made in physiology from the time of Vesalius until the beginning of the nineteenth century. In the same series Prof. Marshall Ward is issuing a work on grasses on a somewhat novel plan. It is essentially a practical book, to be used in the field and in the laboratory, and should be of use, not only to the botanist, but also to the farmer and the gardener.

WE have received from Messrs. A. E. Staley and Co. a catalogue of microscopes manufactured by the well-known Bausch and Lomb Optical Co. of Rochester, New York, U.S.A. From the description of their works contained in the catalogue it is evident that the method of production is essentially American. Machine tools of the most modern description and specialisation of the manufacture of component parts should result in every article being of the highest class. The instruments listed of the so-called "Continental" type do not call for special notice. Of the cheap stands, the American type microscope (F.) is undoubtedly of good design. The horse-shoe foot is replaced by one of a much more stable tripod form, and the arm carrying the tubes and adjustments is particularly well made, giving freedom all round the stage while securing a firm support for the body-tube. All the usual microscope accessories are listed, but there is nothing of such special design as to call for particular notice.

THE additions to the Zoological Society's Gardens during the past week include two Wild Swine (*Sus scrofa*, ♂ ♀), European, presented by H.M. the King; a Leopard (*Felis pardus*) from West Africa, presented by Captain Guy Burrows; an Eland (*Orias canna*, ♂) from South Africa, presented by the Duke of Bedford; two Grey-breasted Parrakeets (*Myopsittacus monachus*) from Monte Video, presented by Mrs. Brownrigg; two Ground Snakes (*Typhlops exocoeti*) from Christmas Island, presented by Sir John Murray, K.C.B., F.R.S.; a Grey-cheeked Mangabey (*Cercocebus albigena*) from West Africa, a Brazilian Tree Porcupine (*Sphingurus prehensilis*) from South America, two Black Tortoises (*Testudo nigra*) from the Galapagos Islands, three Dark Green Snakes (*Zamenis gemonensis*), two Smooth Snakes (*Coronella austriaca*), European, deposited; a Sambur Deer (*Cervus aristotelis*, ♂) from India, two Javan Peafowls (*Pavo spicifer*, ♂ ♀) from Java, two Peacock Pheasants (*Polyplectron chinquis*, ♂ ♀) from British Burmah, two Australian Sacred Ibises (*Ibis strictipennis*) from Australia, two Summer Ducks (*Æx sponsa* ♂ ♀) from North America, two Blood-breasted Pigeons (*Phlogaenas luzonica*) from the Philippine Islands, four Ruffs (*Machetes pugnax*, ♂ ♂, ♀ ♀), twelve Green Lizards (*Lacerta viridis*), European, purchased.

OUR ASTRONOMICAL COLUMN.

COMET *a* (1901).—The Sydney correspondent of the *Times* reports that a brilliant comet was seen early on Tuesday morning (April 23) at various stations throughout the Australian continent. It was stated to have been near the star Aldebaran (α Tauri).

On Friday, the 26th ult., a telegram received from Dr. Gill announced that the new comet had been observed from the Cape Observatory. It was very brilliant, having a compound triple tail about 10° long. The comet was observed on the eastern horizon some two hours before sunrise and was rapidly approaching the sun, so that it may be expected to become more brilliant as perihelion is passed. It was seen by the observers at the Yerkes Observatory at Wisconsin early on Saturday morning last, about 15° north of the sun. This indicated that it had made a very rapid north-westerly movement in relation to its position when seen at the Cape. It was visible for fully twenty minutes before sunrise and about fifteen minutes after, and is considered the brightest comet seen for the last nineteen years. No account has yet been received of the comet having been seen in this country.

THE APRIL METEORS OF 1901.

A SERIES of very clear nights enabled these objects to be looked for in favourable circumstances this year. Moreover, the moon was absent, so that the smaller class of meteors could be well seen projected on the dark blue of the cloudless sky. Meteors are usually very rare in April, and it is only the shower of Lyrids, occurring in past years on about the 20th, that has made the month interesting to meteoric observers. The display apparently returns annually, but it is often inconspicuous and rarely proves as rich as the August Perseids.

On April 13, 17, 18 and 19 I maintained a watch of the north-east region of sky, but found meteors scarce and there were very few Lyrids. The minor showers of the epoch gave little sign of their presence; in fact, meteoric apparitions were so few and far between that observers found their patience sorely tested. Prof. Herschel watched perseveringly at Slough on the nights of April 10, 13, 14, 15, 16 and 17, and, in the aggregate, only recorded twenty meteors in 8½ hours.

On April 20 at Bristol the sky was brilliantly clear, and I kept a look-out during about five hours of the period from 9h. 50m. to 15h. 30m, but observed only twenty-nine meteors. Not a single Lyrid was included amongst them, though several bright, swift-moving meteors fell from a bordering radiant at 261° + 36° in Hercules.

On April 21 the firmament was less favourable, but soon after commencing to watch at 9h. 45m. I found meteors extremely numerous. Several of the minor showers were very active, and the Lyrids formed a pretty rich display. During 3¼ hours' watching, up to 14h. (allowing for occasional interruptions by clouds), I counted fifty-two meteors, and of these there were twenty-five Lyrids from a radiant about 5 degrees in diameter with 270° + 33° as a centre. But while registering the observed paths of the meteors seen, many others must have eluded detection. The horary rate of meteoric apparitions for a continuous watch of the firmament by one observer would have been about 25 and the proportion of Lyrids 12. The figures represent rather an unusual display, though falling far short of the strength of the Perseids and some other periodical showers. It must be remembered, however, that at the epoch of the Lyrids meteors are generally very rare, and that the principal shower is itself sometimes very feeble, if not quite invisible.

The fact of the maximum being so definitely marked on April 21, while there was a comparative absence of Lyrids on April 19 and 20, shows that for some time in future we must expect these meteors on the former date. This is, no doubt, owing to 1900 not having been a leap year. And the shower appears to be a very fugitive, short-lived one, or it must have exhibited more decided traces on April 19 and 20. Though I saw no Lyrids whatever at Bristol on April 20, Prof. Herschel informs me that he observed 5 during the night.

Nearly all the Lyrids seen this year were accompanied with streaks; this feature was, indeed, as well shown as it usually is in the case of the Perseids, Orionids and Leonids. When the radiant was rather low on April 21, the apparent motions were estimated as slow and slowish; but in the later hours of the night, with increasing altitude of the radiant, the velocity appeared much swifter.

Some of the meteors from Lyra and other constellations were very interesting, and in the following list I have made a few selections in the hope that the objects may have been observed elsewhere, and that the requisite data may be obtained for computing their real paths in the air.

				From		To		
	h.	m.	Mag.	°	°			
April 21 ...	10	9	♃ ...	278½	+52 ...	304	+70	Lyrid
	10	41	3 ...	202	+40 ...	213½	+ 7	α-β Perseid
	10	50	2 ...	210	+50 ...	171	+40	Lyrid
	10	59	2 ...	218	+52 ...	255	+75	Virginid
	11	23	1 ...	70	+57 ...	88	+50	Cassiopeid
	12	47	2 ...	269	+46 ...	305	+49	Virginid
	13	7	♃ ...	242	+74 ...	130	+74	Lyrid

On April 20, at 10h. 35m., I noticed a brilliant double flash, caused probably by a large meteor at a low altitude, and hidden from my view by houses in this locality.

Two meteors appearing on April 18 were mutually observed at Slough and Bristol. The first was seen at 13h. 19m., and it fell from an altitude of 83 to 55 miles over Oxfordshire. The radiant was at 266° + 33°, so the meteor was an early Lyrid, and it having been well seen at both stations, the direction of its flight was recorded with considerable accuracy. The position of its radiant at 266° + 33°, as compared with the general Lyrid centre at 270° + 33° three nights later, on April 21, proves that this shower, like that of the August Perseids, exhibits a radiant moving eastwards at the rate of about one degree per day. The second meteor doubly observed was registered at 14h. 47m., and it descended from 58 to 44 miles over the borders of Gloucestershire and Oxfordshire. The radiant was at 247° ± 0°, so the meteor belonged to one of the minor showers of the epoch.

Since writing the above I have learnt that two bright meteors, the 1st and 5th in the above list, were observed by Mr. C. L. Brook at Meltham, near Huddersfield, as well as at Bristol. The first was a Lyrid with radiant at 268° + 30°, and it fell from 79 to 54 miles in height over the Midlands. Its length of path was 60 miles and velocity 40 miles per second. The other meteor was a Cassiopeid belonging to a radiant at 21° + 59°,